Exploration of the Earth's Biological Diversity:

An Invited White Paper for the APIO Strategic Focus Area 8 presented by the NASA/NGO Biodiversity Monitoring Working Group

Little has changed since 1992 when the National Academy of Sciences stated "The loss of biodiversity is one of the fastest moving aspects of global change, is irreversible and has serious consequences for the human prospect in the future."[1] However, since that time, NASA's commitment to Earth observation has enabled an increased understanding of the living Earth system, its habitats and its biodiversity. Given the acceleration of human modification of the environment and threats from climate change, regular monitoring and greater understanding of the consequences of change are essential. It is critical that threats to biodiversity and ecosystems be formally recognized as a strategic priority within NASA's new research and applications structure and that the gains made over the past few years are not lost.

NASA fulfills a unique leadership role in the global environmental community. Of all the world's remote sensing data providers, none can compare with NASA's active support of environmental monitoring and conservation research . As a result, researchers and conservationists around the world have come to rely on NASA for support that is otherwise unavailable. The application of remotely sensed data to monitoring ecosystems and biodiversity is still in its infancy. The need for increased research of Earth ecosystem dynamics continues to grow. To cease or curtail this focus would be a great loss not only to US and international NGOs, but also to countless organizations and nations without the capacity to develop this technology on their own.

Use of remote sensing is accelerating as a means of monitoring both long-term conservation programs and short-term projects. Conservation organizations and governments are increasingly turning to remote sensing to monitor compliance to environmental treaties, such as the Convention on Biological Diversity (CBD) and Convention to Combat Desertification, the Ramsar Convention on Wetlands of International Importance and others. The CBD 2010 goal to "reduce the rate of biodiversity loss" and the Millennium Development Goal 7 to "ensure environmental sustainability" are examples of global targets that require quantifiable and consistent indicators that can be in part provided through remotely sensed data. Recently, at the World Conservation Congress in Bangkok Thailand, NASA and the International Union for the Conservation of Nature (IUCN) signed a joint declaration to improve access to NASA data, technology, images and remote sensing products.

NASA's open data access policy allows all countries and organizations to be stakeholders in the monitoring, assessment and management of the Earth's biological resources. The national Landsat GeoCover databases, contributed by NASA to the developing nations of the world through UNEP, provide important baselines for assessing the state-of-the-environment and change. The ASTER Protected Area Archive provides

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[1] NAS and the Royal Society of London, 1992. "Population Growth, Resource Consumption, and a Sustainable World."

data suitable for operational use by protected area managers in parks that cannot justify advanced technological solutions. Remotely sensed data are increasingly important components of national and protected area decision support systems. Moderate-resolution systems such as MODIS enable global monitoring of changes, near-real time warning, and study of climate relations with ecosystems and biodiversity.

Science and technological solutions developed by NASA and under NASA funding are increasingly adopted for use in the United States and throughout the world. Partnerships with international NGOs and other international organizations introduce national agencies and organizations to effective use of NASA science and data to address national and regional environmental issues. The use of remote sensing for ecosystem study and biodiversity conservation has a long history, and with the advent of improved technology remote sensing is experiencing rapid growth in the conservation arena. This growth needs to be fostered now, more than ever, to ensure appropriate methods are adopted for using the available remote sensing data and to guide the development of new sensors to address the needs of the conservation community.

The NASA/NGO Biodiversity Monitoring Working Group is a consortium of conservation organizations and associate partners (see table below). Our collaboration is focused on using remote sensing and GIS to increase the effectiveness of our conservation organizations and for developing strategies that will prevent further biodiversity loss and ecosystem degradation. We meet regularly to exchange experiences, coordinate related activities and to provide feedback to NASA on the needs of the conservation community. The participating organizations regularly conduct remote sensing and GIS analyses for research, monitoring and partner training in the U.S. and in international offices. We all benefit in particular from extensive field presence and expertise and a strong record of communication to communities, land managers and government decision makers. Our long-established field presence, commitment to a broad-based biodiversity science, and proven record in raising funds make our Working Group well-positioned to implement science and conservation activities around the world.

The NASA – Conservation NGO Working Group

Organization	Abbreviation	Location	Project Managers
American Museum of Natural History	AMNH	New York, NY	Eleanor Sterling Ned Horning
Conservation Biology Institute	CBI	Corvallis, OR	Jim Strittholt
Conservation International	CI	Washington, DC	Marc Steininger
Global Land Cover Facility ESIP	GLCF	College Park, MD	Ben White
NZP Conservation & Research Center, – Smithsonian Institution	CRC	Front Royal, VA	Peter Leimgruber
The Nature Conservancy	TNC	Arlington, VA	Jamie Ervin Roger Sayre
The Wilderness Society	TWS	Seattle, WA	Janice Thomson
United Nations Environmental Program	UNEP	Sioux Falls, SD	Eugene Fosnight
Wildlife Conservation Society	WCS	Bronx, NY	Eric Sanderson
World Wildlife Fund	WWF	Washington, DC	H. Strand